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(54) Method and device for manufacturing a semiconductor chip.

(57) Semiconductor chip manufacturing method and device by which dicing data specific to the wafertype is stored on a media travelling with/on/attached to wafer(s) and being read out at dicing station by reading means, automatically setting-up the dicing euqipments. Use of bar code as such media.

FIG. 3

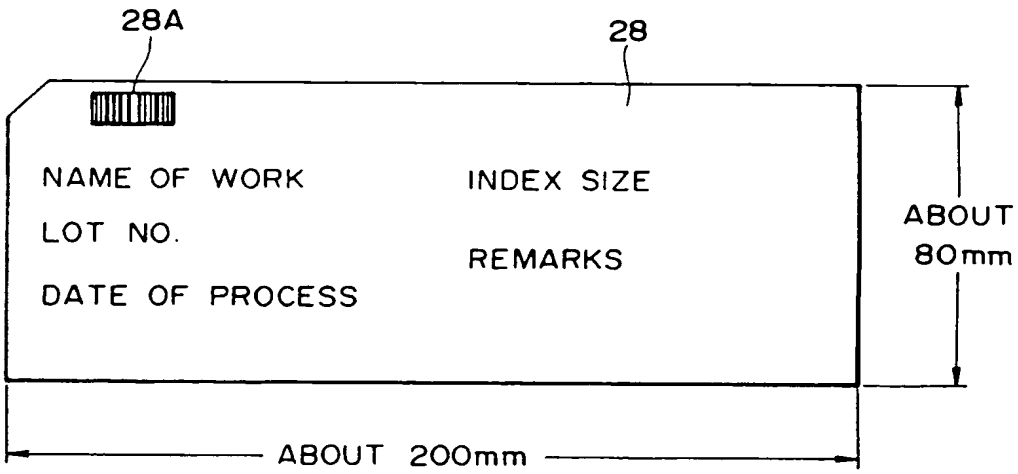

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FIG. 1

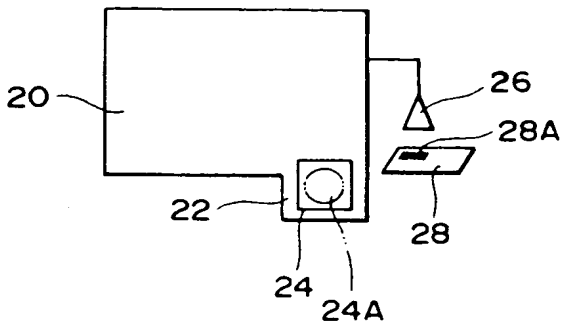
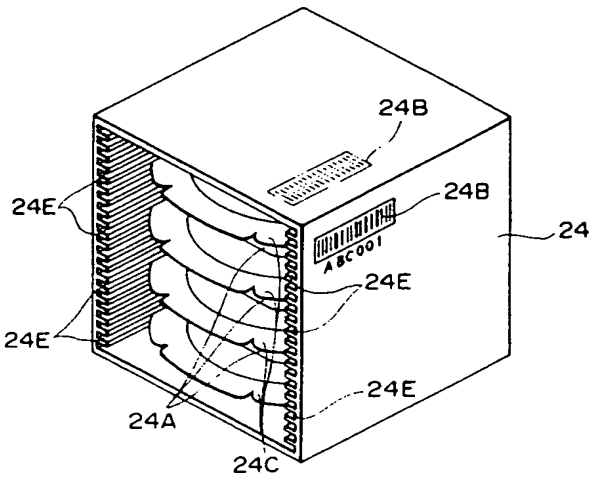


FIG. 8



BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to method and device for manufacturing a semiconductor chip and, in particular, to such method and device which can slice out wafers in accordance with dicing data corresponding to the sizes of wafers so as to manufacture a desired semiconductor chip.

2. Description of the Related Art

A semiconductor chip manufacturing process requires data used to execute the respective manufacturing steps of the process and the data must be previously registered in a controlling computer. For the respective manufacturing steps, necessary data are called out from the controlling computer and the respective manufacturing steps are executed based on the data read out.

In order to read out such data from the controlling computer, as shown in Fig. 9, an ID number 12 is displayed in the linear part of a wafer 10. In the respective manufacturing steps, the ID number 12 is read and data corresponding to the ID number 12 can be read out from the controlling computer in the respective manufacturing steps. In other words, the ID number 12 serves as an identification number or symbol in the physical distribution of the wafer.

However, when the wafer is cut by a dicer, the ID number 12 may be cut off and thus the ID number 12 may not be recognized with accuracy in a step to be performed after a dicing step. For this reason, in order to solve this problem, as shown in Fig. 10, there is disclosed a method which displays an identification number 18 corresponding to the ID number 12 in a frame 16 mounting a wafer 10 thereto through a tape 14 or in the tape 14 itself (Japanese Patent Publication No. 64-12094).

According to the above-disclosed method, there are provided means for generating a relative relation signal indicating a relative relation between the ID number 12 and the identification number 12 given to the frame 16. Due to this structure, even when the ID number 12 is cut, the identification number 18 on the frame 16 can be left and, therefore, even in the step to be performed after the dicing step, by recognizing the identification number 18, the ID number 12 can be identified in the long run.

In general, in a wafer manufacturing process, the wafers 10 attached to the frame 16 must often be stored by a lot unit in a carrier before they are delivered, or the wafer must be stored one by one into a case before it is delivered. In these cases, without recognizing the identification number 18 registered in the frame 16, an operator key inputs the kind, name or the like of the wafer 10 entered in a card or a slip attached to the carrier or case to thereby read out necessary data from a dicer or a controlling computer connected to the dicer, so that the wafer 10 can be cut by the dicer in accordance with the data invoked.

However, in recent years, the respective steps of the wafer manufacturing process have been automated to such an extent that a plurality of machines can be operated by an operator. For this reason, it has been hard for the operator to have special knowledge of each of the machines and the wafer to be manufactured. This causes troubles to occur, makes it difficult to operate the machine quickly, and gives rise to the lowered productivity.

SUMMARY OF THE INVENTION

The present invention aims at eliminating the drawbacks found in the above-mentioned wafer manufacturing methods and devices according to the prior art.

Accordingly, it is an object of the invention to provide semiconductor chip manufacturing method and device which can be operated in a simple manner with no need of special knowledge of machines to be used and thus can enhance the productivity.

In order to accomplish the above object, according to the invention, there is provided a semiconductor chip manufacturing method which comprises the steps of: storing dicing data corresponding to the kinds of wafers; when the data indicating the kind of the wafer is input, reading out the dicing data corresponding to the data input; and, cutting the wafer set at a given position to a desired shape in accordance with the dicing data, characterized in that there is provided read means for inputting the data indicating the kind of the wafer, and also in that a symbol indicating the kind of the wafer is recorded in a member moving together with said wafer in a chip manufacturing process as an identification number which can be read by the above-mentioned read means, and when the data indicating the kind of the wafer is input, the above-mentioned identification number recorded in the above-mentioned member can be read by the above-mentioned read means.

According to the invention, a symbol indicating the kind of a wafer is recorded in a member moving together with the wafer in a chip manufacturing process, for example, in a storage case for storing the wafer therein, in a wafer identification card attached to the storage case, in a frame for holing the wafer, or in a tape used to attach the wafer to the frame, as an identification number such as a bar code or the like which can be read by read means, and, when the data indicating the kind of the wafer is input, the identification number recorded in one of the above-mentioned members can be read by the read means. For this reason, even if an operator does not have special knowledge of machines to be used in the chip manufacturing process and of wafers to be manufactured, it is possible for the operator to operate the machines with ease.

BRIEF DESCRIPTION OF THE DRAWINGS

The exact nature of this invention, as well as other objects, features and advantages thereof, will be readily apparent from consideration of the following specification relating to the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof and wherein:

Fig. 1 is a plan view of a dicer employed in a semiconductor chip manufacturing device according to the invention;

Fig. 2 is a plan view of a dicer and a controlling computer employed in the invention, illustrating a relation between them;

Figs. 3 and 4 are respectively plan views of cards used in a semiconductor chip manufacturing method according to the invention;

Fig. 5 is a plan view of a wafer case for storing a wafer therein;

Fig. 6 is a plan view of a state in which the wafer case has been carried to the dicer;

Fig. 7 is a plan view of another embodiment of a semiconductor chip manufacturing method according to the invention;

Fig. 8 is a perspective view of a carrier employed in the invention, illustrating a state in which wafers are stored in the carrier;

Fig. 9 is a plan view of a wafer; and,

Fig. 10 is a plan view of a wafer and a frame according to the invention, illustrating a state in which the wafer has been mounted on the frame.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Detailed description will hereunder be given of the preferred embodiments of a method for manufacturing a semiconductor chip and a device for enforcing the same method according to the present invention with reference to the accompanying drawings.

In Fig. 1, there is shown a plan view of a dicer 20. The dicer 20 includes a wafer supply part 22 which is able to receive a wafer case 24 conveyed from a previous manufacturing step. A wafer 24A is stored in the wafer case 24. Also, in the dicer 20, there is provided a bar code reader 26 which is able to recognize a bar code 28A displayed on a card 28 to be described later only tracing the surface of the card 28. The card 28 is attached to the wafer case 24 and is then conveyed together with the wafer case 24.

Also, the dicer 20, as shown in Fig. 2, is connected to a controlling computer 30 and, in general, data necessary for the dicer 20 is previously registered in the controlling computer 30. However, data not registered in the controlling computer 30 is registered in a memory part of the dicer 20 and the registered data is set to be transmittable to the controlling computer 30.

With regard to the shape and kind of the card 28 described above, such cards as shown in Figs. 3 and 4 can also be employed. A card 28 shown in Fig. 3 is formed in a so called mark sheet card size (having a length of about 200 mm, and a height of about 80 mm). A bar code 28A is displayed on the upper left portion of Fig. 3 by means of bonding, printing or similar means.

The bar code 28A is set such that it has a given relation with respect to an ID number 12 (see Fig. 9) which is displayed on the wafer 10.

For example, it is possible to employ a method in which the number of the bar code 28A is marked as a specific value on a carrier 24 for storing the wafer 24A therein and the bar code number is managed by means of the number of frames. In other words, in a previous step to the dicer 20, when or after the wafer 24A is bonded to the frame 24C by means of a mounter (not shown), a bar code number, which is shown in Table 1 and corresponds to the kind of the wafer 24A, is marked on the carrier 24 and the marked data is managed by the controlling computer or the marked data is stored in a floppy disc, a memory card, a magnetic card or the like. And, the bar code number is registered in the card 28. In Fig. 5, 24D designates

an ID number.

Table 1

Kinds of Wafers	Bar Code Nos.
TSK001	000001
TSK100	010000
:	:
:	:

For another example. the number of the bar code 28A may be set to be identical with the kind of the wafer 24A. as shown in Table 2.

Table 2

Kinds of Wafers	Bar Code Nos.
TSK001	TSK001
TSK100	TSK100
:	:
:	:

A user's mark. a rod No., the date of processing. a wafer size and the like can be written into the remaining spaces of the card 28.

Referring now to Fig. 4. a card 28 is formed in the shape of a so called telephone card size (having a length of about 100 mm. and a height of about 60 mm). Similarly to the card of Fig. 3, a bar code 28A is displayed in the left end portion of the card 28 and a user's mark. an index, a wafer size and the like can be written into the remaining spaces of the card 28. Also. in the magnetic portion of the back surface of the card 28. a rod No. the date of processing and the like can be registered and the data registered in such magnetic portion can be rewritten.

Next. description will be given below of the operation of the semiconductor chip manufacturing device of the invention constructed in the above-mentioned manner.

At first, the processing data of the wafers are previously registered in a controlling computer 30 shown in Fig. 2 in such a manner that the wafer processing data correspond to the ID numbers of the wafers (that is, a relation shown in Table 1 or Table 2 is registered). And, as for the data not registered in the controlling computer 30, the data are previously registered in a memory part of the dicer 20 and such data are set to be transmittable to the controlling computer 30.

Next, a bar code writer (not shown) in a previous step to the dicer 20 is used to bond or print the bar code 28A at a given position of the card 28, the card 28 is attached to the wafer case 24, and the card 28 is delivered together with the wafer case 24. When the wafer case 24 is delivered to a wafer supply part 22 of the dicer 20, then an operator takes off the card 28 attached to the wafer case 24 and the bar code reader 26 is contacted with the surface of the card 28 to thereby read out the bar code 28A.

The bar code reader 26 reads out the bar code 28A and at the same time requests necessary data from the controlling computer 30 in accordance with the signal of the bar code 28A. Responsive to this, the necessary data is applied from the controlling computer 30 to the dicer 20 and the dicer 20, in accordance with the thus applied data, aligns the wafer 24A of the wafer case 24 by use of alignment means and then cuts the wafer 24A with the rotary edges thereof into a desired semiconductor chip.

Although in the above-mentioned embodiment the controlling computer 30 is used to change the kinds of the wafers in the dicer 20, this is not limitative, but only the memory part of the dicer 20 can be used to carry out the wafer kind change. In this case, the bar code reader 26 calls out data, which corresponds to the bar code 28A read out, from the memory part of the dicer 20 and, responsive to the data called out, the dicer 20 is set to be operable (that is, the dicer 20 is switched to a state thereof suitable for machining of the wafer 24A). As a result of this, the wafer 24A can be aligned and diced.

As mentioned above, the bar code reader 26 of the dicer 20 is able to recognize the bar code 28A simply by touching the surface of the card 28 and is also able to output the thus recognized signal to the controlling computer 30 to call out the necessary data therefrom. Due to this, when the wafer 24A is diced

by use of the dicer 20, there is eliminated the need for an operator to key input the data, thereby reducing the occurrences of troubles as well as enhancing the productivity of the wafers.

Also, due to the fact that the bar code reader 26 is inexpensive when compared with a recognizing device for recognizing the ID number, even if the bar code reader is provided in every wafer manufacturing step, it does not increase the cost of the wafer manufacturing line.

Further, in the above-mentioned embodiment, the bar code 28A is registered as another embodiment for displaying the ID number. However, this is not limitative, but other display means such as a magnetic card or the like can also be employed, provided that it can be recognized easily.

In the above-mentioned embodiment, the bar code 28A is displayed on the card 28. However, the invention is not limited to this but, as shown in Fig. 5, a bar code 24B may be displayed on the wafer carrier 24. In this case, as shown in Fig. 6, when the wafer carrier 24 is conveyed to the wafer supply part 20, the operator uses the bar code reader 26 to read the bar code 24B. By the way, Fig. 5 is a view obtained by rewriting Fig. 8 into a plan view and the bar code 24B can be displayed on the upper surface, side surface or the like of the wafer carrier 24. Also, in Fig. 8, 24E designates a groove into which the wafer 24 is mounted.

Also, in the above-mentioned embodiment, the bar code is displayed on the card 28 or on the wafer case 24. However, other way of displaying is also possible. For example, as shown in Fig. 7, a bar code 42 and a name 44 of a wafer corresponding to the bar code 42 may be previously registered in a sheet of paper 40. When observing the wafer name (for example, TS002) displayed on the card conveyed together with the wafer, an operator may bring the bar code reader 26 into contact with a bar code 42A corresponding to the wafer name (TS002) to read the bar code 42A, thereby switching the dicer 20.

As has been described heretofore, according to method and device for manufacturing a semiconductor chip in accordance with the present invention, even without special knowledge of machines used in the present manufacturing method and wafers to be manufactured, the machines can be operated with ease so that the productivity of the wafers can be enhanced.

It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the invention is to cover all modifications, alternate constructions and equivalents falling within the spirit and scope of the invention as expressed in the appended claims.

Claims

1. In a semiconductor chip manufacturing method comprising the steps of storing dicing data corresponding to the kinds of wafers (24A), when data indicating the kind of the wafer (24A) is input, reading out the dicing data corresponding to the data input, and cutting the wafer (24A) set at a given position to a desired shape in accordance with the dicing data to thereby manufacture a semiconductor chip, the improvement comprising the steps of:

   providing read means (26) for inputting said data indicating said kind of said wafer (24A);

   recording a symbol (18, 24A, 28A) indicating said kind of said wafer in a member (14, 16, 24, 28) moving together with said wafer (24A) in a chip manufacturing process as an identification symbol readable by said read means (26); and,

   prior to input of said data indicating said kind of said wafer, allowing said read means (26) to read said identification symbol (18, 24B, 28A) recorded in said member (14, 16, 24, 28).

2. A semiconductor chip manufacturing method as set forth in Claim 1, wherein said identification symbol (18, 24B, 28A) is a bar code (18, 24B, 28A) and said read means (26) is a bar code reader (26).

3. In a semiconductor chip manufacturing method comprising the steps of storing dicing data corresponding to the kinds of wafers (24A), when data indicating the kinds of the wafer (24A) is input, reading out the dicing data corresponding to the data input, and cutting the wafer (24A) set at a given position to a desired shape in accordance with the dicing data to thereby manufacture a semiconductor chip, the improvement comprising the steps of:

   providing read means (26) for inputting said data indicating said kind of said wafer (24A);

   previously registering the names (44) of wafers (24A) respectively to be marked on members (14, 16, 24, 28) moving together with said wafers (24A) and identification symbols (42) respectively corresponding to said names (44) and readable by said read means (26) in a table (40);

   when each of said data indicating said kinds of said wafer is input, searching out one of said identification symbols (42) corresponding one of said names from said table (40) in accordance with the wafer name marked in one of said members (14, 16, 24, 28); and,

allowing said read means (26) to read out the identification symbol (42) searched out.

4. A semiconductor chip manufacturing method as set forth in Claim 3, wherein said identification symbol (44) is a bar cord (44) and said read means (26) is a bar code reader (26).

5. In a semiconductor chip manufacturing device which stores dicing data corresponding to the kinds of wafers (24A), when data indicating the kind of the wafer (24A) is input, reading out the dicing data corresponding to the data input, and cutting the wafer (24A) set at a given position to a desired shape in accordance with the dicing data to thereby manufacture a semiconductor chip, the improvement comprising:

read means (26) for inputting said data indicating said kind of said wafer (24A); and,

a member (14, 16, 24, 28) moving together with said wafer (24A) in a chip manufacturing process and having a symbol (18, 24B, 28A) indicating said kind of said wafer (24A) recorded thereon, said symbol serving as an identification symbol readable by said read means (26).

6. A semiconductor chip manufacturing device as set forth in Claim in 5, wherein said member (14, 16, 24, 28) on which said identification symbol (18, 24B, 28A) is recorded is one of a storage case (24) for storing a wafer (24A) therein, a card (28) for identifying a wafer to be attached to said storage case (24), a frame (14) for holding said wafer (10), and a tape (16) for attaching said wafer (10) to said frame (14).

7. A semiconductor chip manufacturing device as set forth in Claim 6, wherein said read means (26) is a bar code reader (26) and said identification symbol (18, 24B, 28A) is a bar code (18, 24B, 28A).

FIG. 1

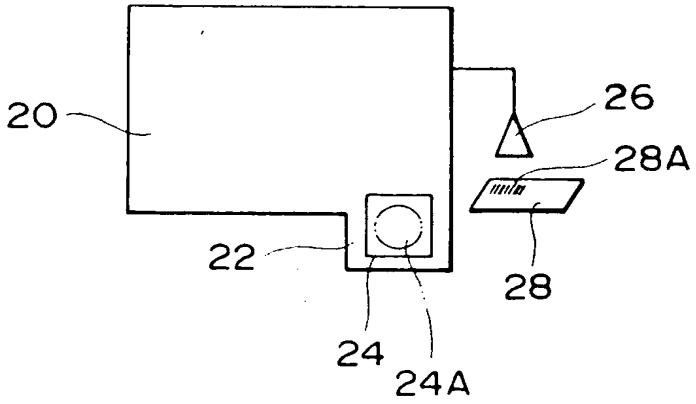


FIG. 2

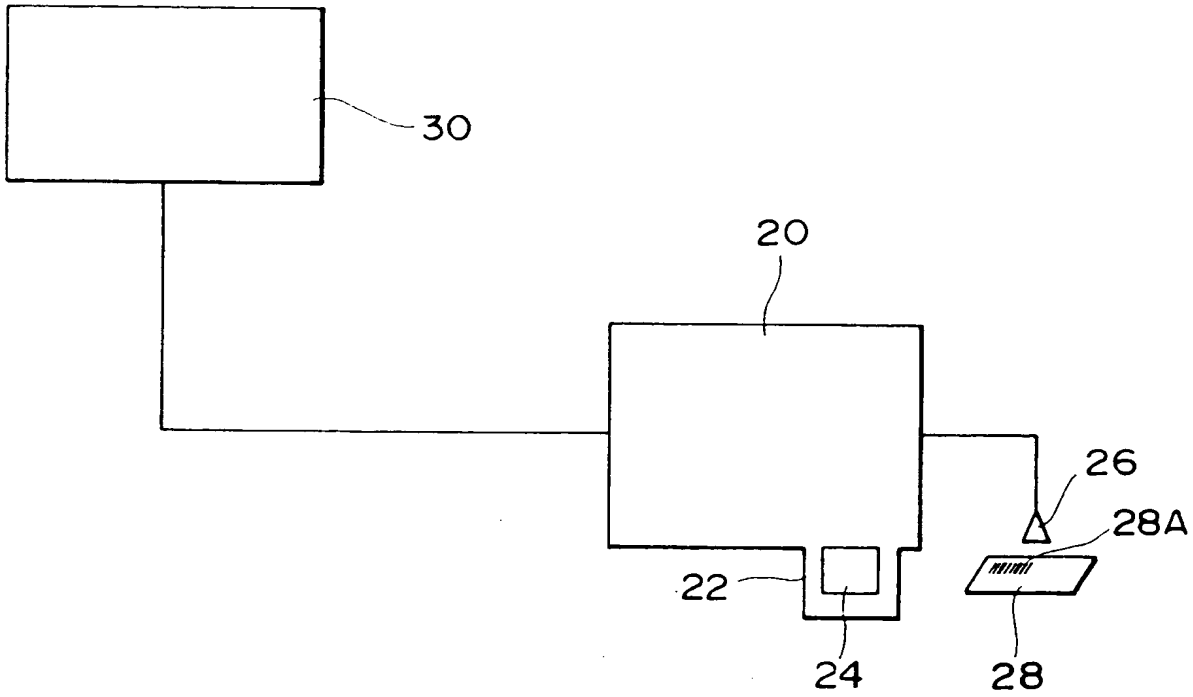


FIG. 3

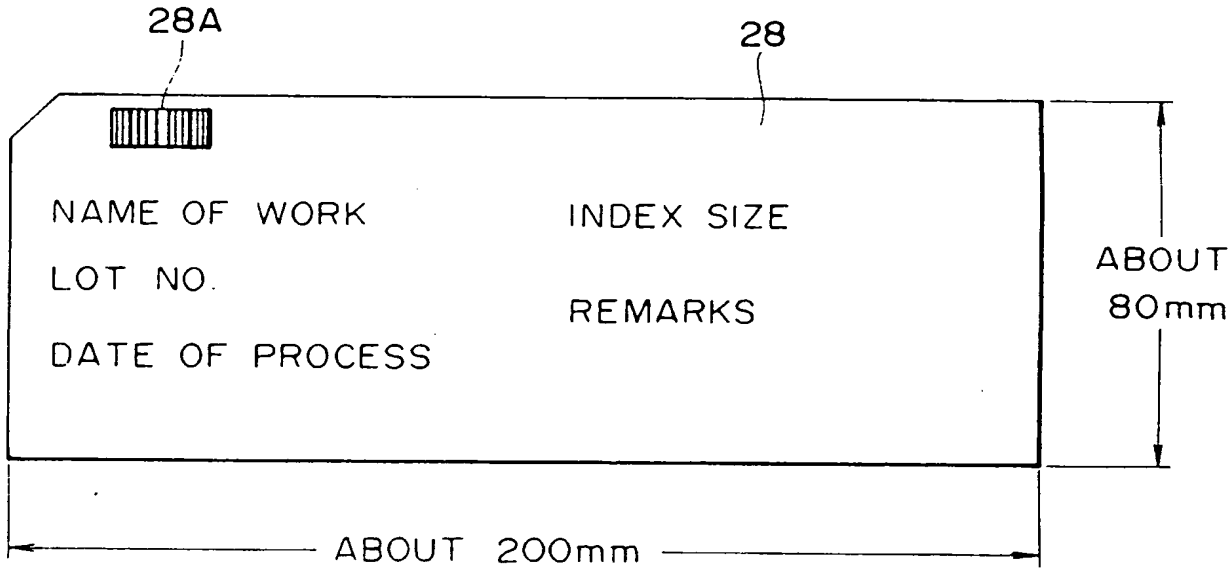

28A
28
NAME OF WORK
LOT NO.
DATE OF PROCESS
INDEX SIZE
REMARKS
ABOUT
80mm
ABOUT 200mm

FIG. 4

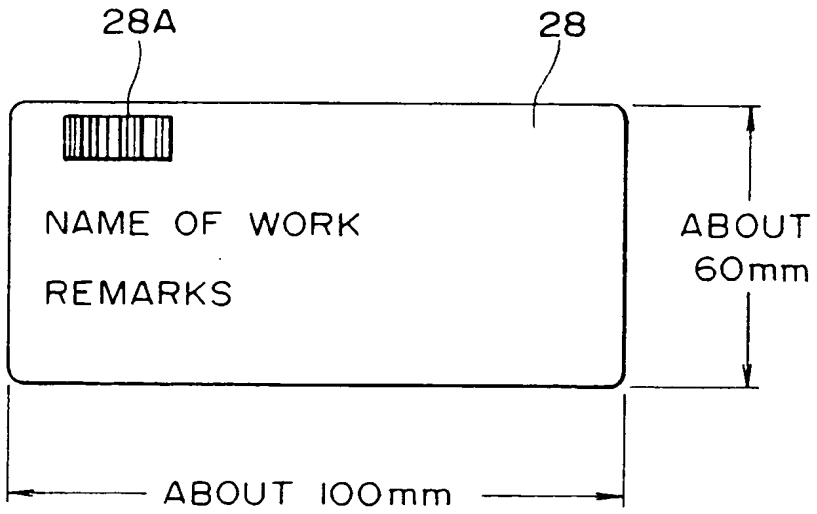

28A
28
NAME OF WORK
REMARKS
ABOUT
60mm
ABOUT 100mm

FIG. 5

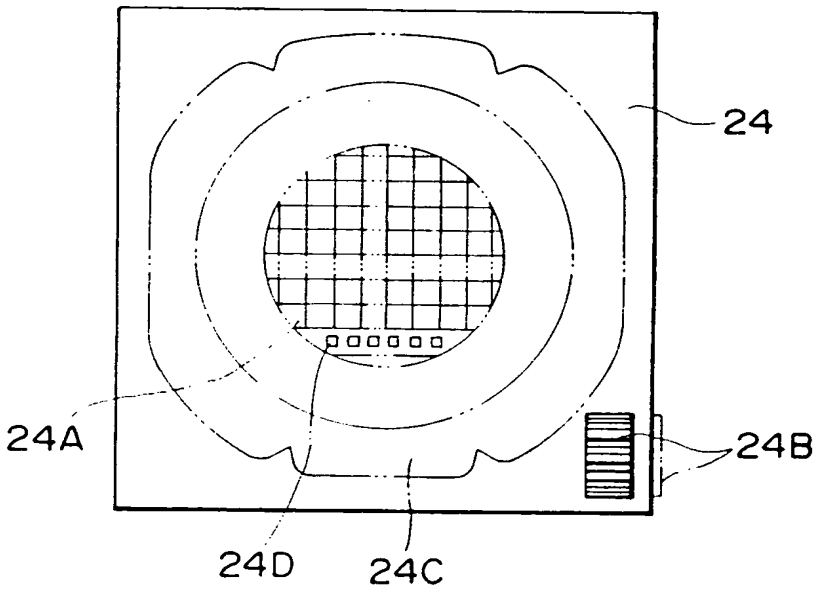


FIG. 6

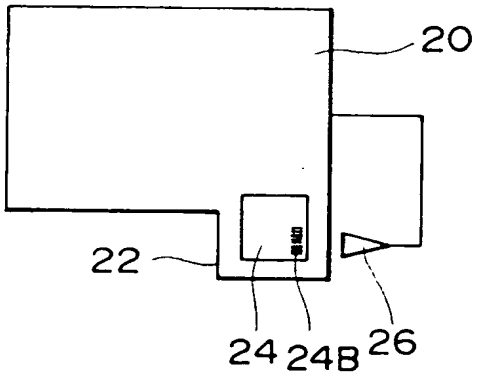


FIG. 7

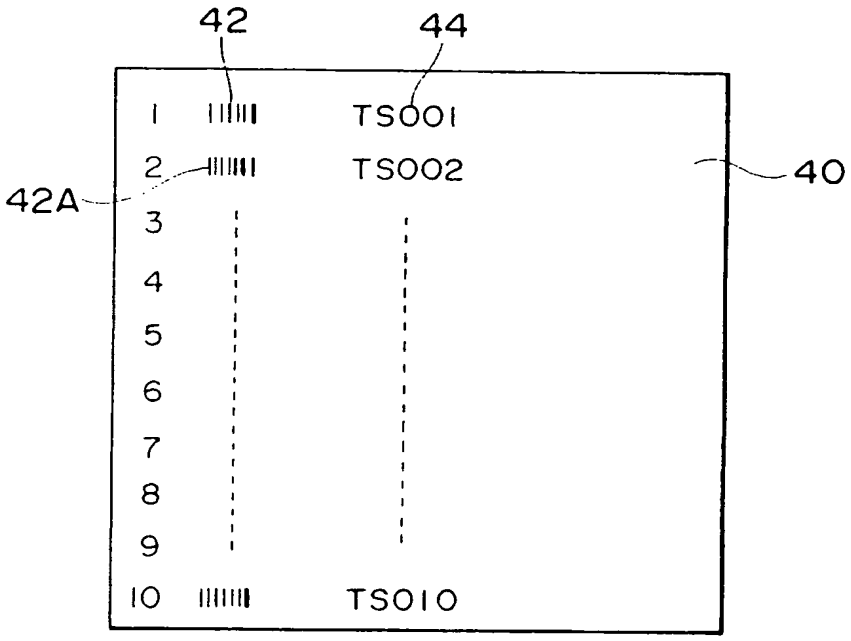

42
44
1
2
3
4
5
6
7
8
9
10
TS001
TS002
TS010
42A
40

FIG. 8

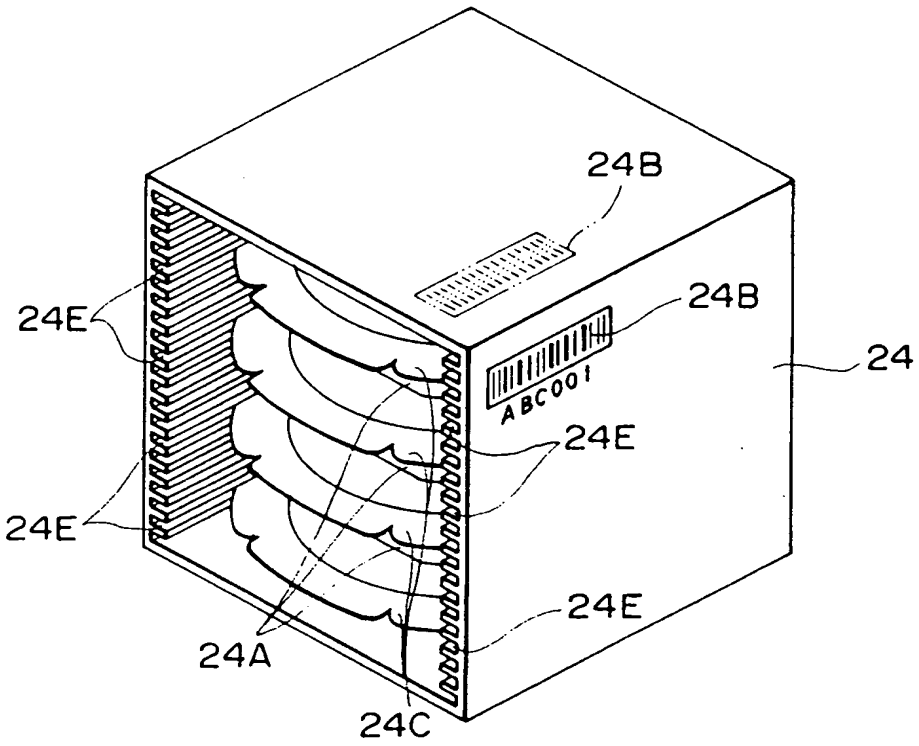

24B
24B
24E
24
ABC001
24E
24E
24E
24A
24C

FIG. 9

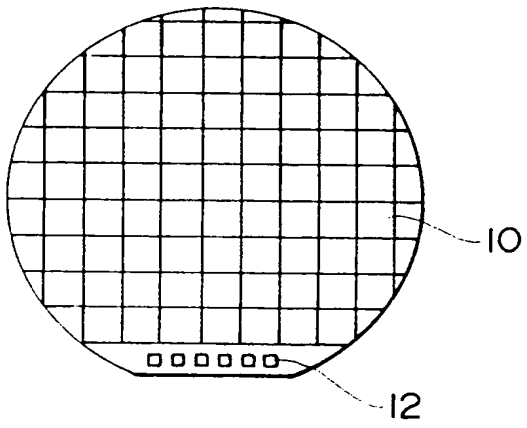
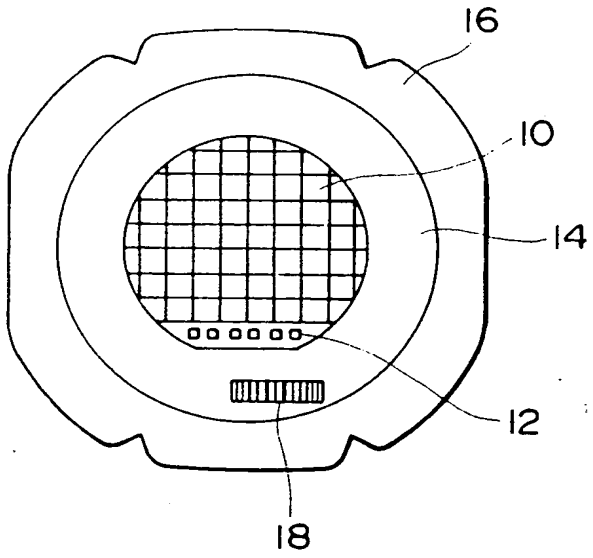


FIG. 10



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 11 9860

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	PATENT ABSTRACTS OF JAPAN vol. 9, no. 284 (E-357)(2007) 12 November 1985 & JP-A-60 124 952 (FUJITSU K.K.) * abstract *	1-7	H01L23/544
A	PATENT ABSTRACTS OF JAPAN vol. 5, no. 171 (E-80)(843) 30 October 1981 & JP-A-56 100 454 (MITSUBISHI DENKI K.K.) * abstract *	1-7	
A	RESEARCH DISCLOSURE. no. 285, January 1988, NEW YORK page 45; 'Tape Automated Bonding' Abstractnr.:28 557 * the whole document *	1-7	
A	PATENT ABSTRACTS OF JAPAN vol. 8, no. 49 (E-230)(1486) 6 March 1984 & JP-A-58 202 537 (MITSUBISHI DENKI K.K.) * abstract *	6,7	
A	EP-A-0 249 762 (FUJITSU LTD.) * abstract; figures 1,2,4 *	6,7	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	EP-A-0 132 520 (IBM) * abstract; figure 1 *	6,7	H01L
A	SOLID STATE TECHNOLOGY. vol. 23, no. 7, July 1980, WASHINGTON US pages 54 - 55; G. DUNCAN: 'Proposed Alphanumeric Marking Standards for 125mm Silicon Wafers'		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 FEBRUARY 1992	PROHASKA G.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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